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National Advisory Committee for Aeronautics

Research Abstracts

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CURRENT NACA REPORTS

NACA Rept. 1016

EFFECT OF TUNNEL CONFIGURATION AND TESTING TECHNIQUE ON CASCADE PERFORMANCE. John R. Erwin and James C. Emery. 1951. ii, 15p. diagrs., photos. (NACA Rept. 1016. Formerly TN 2028)

An investigation has been conducted to determine the influence of aspect ratio, boundary-layer control by means of slots and porous surfaces, Reynolds number and tunnel end-wall condition upon the performance of airfoils in cascades. A representative compressor-blade section (the NACA 65-(12)10) of aspect ratios of 1, 2, and 4 has been tested at low speeds in cascades with solid and with porous side walls. Two-dimensional flow was established in porous-wall cascades of each of the three aspect ratios tested: the flow was not two-dimensional in any of the solid-wall cascades.

NACA Rept. 1032

A COMPARISON OF THEORY AND EXPERIMENT FOR HIGH-SPEED FREE-MOLECULE FLOW. Jackson R. Stalder, Glen Goodwin and Marcus O. Creager. 1951. ii, 22p. diagrs., photos. (NACA Rept. 1032. Formerly NACA TN 2244)

A comparison is made of free-molecule-flow theory with the results of wind-tunnel tests performed to determine the drag and temperature-rise characteristics of a transverse circular cylinder. The measured values of the cylinder center-point temperature confirmed the salient point of the heat-transfer analysis which was the prediction that an insulated cylinder would attain a temperature higher than the stagnation temperature of the stream. Good agreement was obtained between the theoretical and the experimental values for the drag coefficient.

NACA Rept. 1033

COMPARISON BETWEEN THEORY AND EXPERIMENT FOR WINGS AT SUPERSONIC SPEEDS. Walter G. Vincenti. 1951. ii, 11p. diagrs., photos. (NACA Rept. 1033. Formerly TN 2100)

A critical comparison is presented between experimental and theoretical results for the aerodynamic characteristics of wings at supersonic flight speeds. After a brief review of supersonic wing theory and of previous results from two-dimensional pressure-distribution tests, an account is given of an NACA study of the force characteristics of three dimensional wings at supersonic speed. Typical experimental and theoretical results are presented for the lift, pitching-moment, and drag characteristics of several families of wings of varying plan form and section. The regions of agreement and disagreement between experiment and theory are noted and discussed.

NACA Rept. 1034

INVESTIGATION OF SPOILER AILERONS FOR USE AS SPEED BRAKES OR GLIDE-PATH CONTROLS ON TWO NACA 65-SERIES WINGS EQUIPPED WITH FULL-SPAN SLOTTED FLAPS. Jack Fischel and James M. Watson. 1951. ii, 25p. diagrs. (NACA Rept. 1034. Formerly TN 1933)

Contains results and discussion of an investigation of plug and retractable ailerons used as speed brakes or glide-path controls on an NACA 65-210 wing and an NACA 65_2-215 wing of aspect ratio 5.76 equipped with full-span slotted flaps. Incremental lift, drag, and pitching-moment data are presented for various flap conditions through a large angle-of-attack range at Mach numbers from 0.13 to 0.71. Analysis indicates that this use of spoiler ailerons is feasible and desirable for normal or emergency operation of airplanes. These speed brakes or glide-path controls would probably have small effect on wing pitching moments and should retain their rolling effectiveness.

NACA TN 2598

A TECHNIQUE APPLICABLE TO THE AERODYNAMIC DESIGN OF INDUCER-TYPE MULTISTAGE AXIAL-FLOW COMPRESSORS. Melvyn Savage and Loren A. Beatty. March 1952. ii, 62p. diagrs., 8 tabs. (NACA TN 2598)

A method is presented for the preliminary design of high-pressure-ratio multistage axial-flow compressors using the solid-body inducer design in which the first stage has the radial total-temperature distribution required to make the second-stage inlet axial velocity constant radially. The remaining stages have constant power input radially, solid-body average tangential velocities, and radially constant inlet axial velocities. Typical preliminary design calculations are presented for inlet hub-tip ratios of 0.40, 0.50, and 0.60 with weight flows ranging from 20.0 to 32.5 pounds per second per square foot of frontal area and average pressure ratios per stage ranging from 1.28 to 1.38. Some of the effects of specific weight flow, rotational speed, hub-tip ratio, turning angle, and inlet air angle on power input, amount of

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radial flow, and over-all pressure ratio are investigated.

NACA TN 2640

INTERACTION OF COLUMN AND LOCAL BUCKLING IN COMPRESSION MEMBERS. P. P. Bijlaard and G. P. Fisher, Cornell University. March 1952. 110p. diagrs., photos., 4 tabs. (NACA TN 2640)

Simple formulas are obtained which express the actual buckling stress directly in terms of the column or plate buckling stresses. Columns with box, I-, H-, and T-sections and angles are considered separately. Interaction of practically significant magnitude occurs only in cases of flexural and torsional buckling. In these cases the additional effect of distorsion of the cross section is also taken into account. The theory includes buckling in the plastic range. Tests were carried out for a considerable range of ratios of corrected free length to radius of gyration on two sections, for one of which the local buckling stress was in the plastic, and for the other, in the elastic, domain. The experimental buckling stresses are in excellent agreement with those predicted by the theory.

NACA TN 2665

AN EXTENSION OF LIFTING ROTOR THEORY TO COVER OPERATION AT LARGE ANGLES OF ATTACK AND HIGH INFLOW CONDITIONS. Alfred Gessow and Almer D. Crim. April 1952. 36p. diagrs. (NACA TN 2665)

The report derives analytical expressions for the flapping, thrust, torque, and profile-drag power of a hinged rotor in which the small-angle limitations and the assumption of nonstalled flow in the reversed-velocity region of standard rotor theory are removed. The equations are thus applicable to high-speed helicopters and to certain types of convertible aircraft.

NACA TN 2667

GENERALIZED LINEARIZED CONICAL FLOW. W. D. Hayes, R. C. Roberts and N. Haaser, Brown University. March 1952. 48p. diagrs., tab. (NACA TN 2667)

A basic theory of generalized linearized supersonic conical flow for both inside and outside the Mach cone was developed and applied to several specific problems including unsteady-flow conditions. A triangular lifting wing in pitching and rolling with both subsonic and supersonic leading edges was investigated and pressure coefficients were obtained. A family of thin sweptback triangular wings having symmetrical thickness distribution was also investigated and analytic expressions for wave drag and pressure coefficients were determined. Values of wave-drag coefficients were calculated and the results presented graphically.

NACA TN 2668

EXPERIMENTAL INVESTIGATION OF A 90° CASCADE DIFFUSING BEND WITH AN AREA RATIO OF 1.45:1 AND WITH SEVERAL INLET BOUNDARY LAYERS. Daniel Friedman and Willard R. Westphal. April 1952. 30p. diagrs., photos., 2 tabs. (NACA TN 2668)

An experimental investigation was conducted in order to determine the performance of a 90° cascade diffusing bend with an area ratio of 1.45:1 and a 19-inch-square inlet with several inlet-boundary-layer shapes and thicknesses. The maximum mean inlet Mach number was 0.41 and the corresponding airfoil Reynolds number was 950,000. The experimental results seem to indicate that, when the duct configuration requires a bend, a certain amount of diffusion can be obtained without an appreciable rise in the total-pressure losses. If length is important, this configuration requires much less space than the usual diffuser-bend combination.

NACA TN 2669

APPROXIMATE THEORY FOR CALCULATION OF LIFT OF BODIES, AFTERBODIES, AND COMBINATIONS OF BODIES. Barry Moskowitz. April 1952. 39p. diagrs. (NACA TN 2669)

An expression is developed for the lift of a slender afterbody in terms of the "slender-body" approximate potential at the after end in conjunction with a suitably calculated value of the potential at the forward end. The failure of the usual "slender-body" theory to predict any lift on a slender cylindrical afterbody is thereby corrected. The same expression is used to compute the part of the interference lift generated by the presence of a neighboring body, due to the interference upwash. Another expression is developed to compute the remainder of the interference lift, due to an interference pressure gradient. The lift is determined for a cone-cylinder body, a cylindrical afterbody of a slender wing-body combination, and three combinations of bodies to illustrate the method.

NACA TN 2671

INVESTIGATION OF STRESS DISTRIBUTION IN RECTANGULAR PLATES WITH LONGITUDINAL STIFFENERS UNDER AXIAL COMPRESSION AFTER BUCKLING. Chi-Teh Wang and Harry Zuckerberg, New York University. March 1952. 61p. diagrs. (NACA TN 2671)

An investigation was carried out to study the elastic behavior after buckling of a rectangular plate reinforced with longitudinal stiffeners and subjected to compressive loads in a direction parallel to the stiffeners. Two possible buckling modes were investigated, namely, that in which the plate buckles around the stiffeners as nodal lines and that in which the plate buckles with the intermediate stiffeners as a unit. For the first buckling mode the calculated results were compared with experimental results and the agreement was found to be good. The method of analysis used is a modified variational procedure; this was found to give much better results with the same amount of computational labor.

NACA TN 2673

THEORETICAL PERFORMANCE OF AN AXIAL-FLOW COMPRESSOR IN A GAS-TURBINE ENGINE OPERATING WITH INLET WATER INJECTION. Reece V. Hensley. March 1952. 25p. diagrs. (NACA TN 2673)

The performance of an axial-flow compressor operating in a gas-turbine engine with inlet water injection and compressor-outlet saturation was theoretically evaluated. Changes in compressor pressure ratio, compressor efficiency, and compressor work due to water injection were determined for altitudes up to 50,000 feet, Mach numbers up to 2.0, and normal compressor pressure ratios of 4, 8, and 16.

NACA TN 2679

THE STABILITY UNDER LONGITUDINAL COMPRESSION OF FLAT SYMMETRIC CORRUGATED-CORE SANDWICH PLATES WITH SIMPLY SUPPORTED LOADED EDGES AND SIMPLY SUPPORTED OR CLAMPED UNLOADED EDGES. Paul Seide. April 1952. 27p. diagrs. (NACA TN 2679)

A theory for the elastic behavior of orthotropic sandwich plates is used to determine the compressive buckling-load parameters of flat symmetrical corrugated core sandwich plates with simply supported loaded edges and simply supported or clamped unloaded edges.

NACA TN 2680

FLAME SPEEDS OF 2, 2, 4-TRIMETHYLPENTANE-OXYGEN-NITROGEN MIXTURES. Gordon L. Dugger and Dorothy D. Graab. April 1952. 25p. diagrs., photo., 2 tabs. (NACA TN 2680)

Flame speeds of homogeneous 2,2,4-trimethylpentane-oxygen-nitrogen mixtures were determined as functions of mixture composition at two or three initial temperatures by a Bunsen-burner method. Oxygen-nitrogen mixtures containing 0.210 to 0.496 mole fraction of oxygen were used. Maximum flame speed increased linearly with oxygen concentration for each initial temperature. An empirical equation including the effects of initial temperature and oxygen concentration was obtained. Both a thermal and a diffusion theory predicted the relative effect of oxygen concentration on maximum flame speed within 20 percent. No linear correlations between maximum flame speed and calculated active particle concentrations were obtained.

NACA TN 2681

A COMPRESSIBLE-FLOW PLOTTING DEVICE AND ITS APPLICATION TO CASCADE FLOWS. Willard R. Westphal and James C. Dunavant. April 1952. 21p. diagrs., photos. (NACA TN 2681)

A simplified method has been devised for the solution of two-dimensional compressible flows through well-defined passages. This method makes use of plastic cams which automatically set the length-to-width ratio of rectangles formed by streamlines and equipotential lines represented by spring-steel wires. Pressure distribution around four cascades of turbine blades and along the surface of a choked nozzle determined by this method are shown to compare well with experimental results.

NACA TN 2682

TRANSVERSE VIBRATIONS OF HOLLOW THIN-WALLED CYLINDRICAL BEAMS. Bernard Budiansky and Edwin T. Kruszewski. April 1952. 29p. diagrs. (NACA TN 2682)

The variational principle, differential equations, and boundary conditions considered appropriate to the analysis of transverse vibrations of hollow cylindrical beams are shown. General solutions for the modes and frequencies of cantilever and free cylindrical beams of arbitrary cross section but of uniform thickness are given. The combined influence of the secondary effects of transverse shear deformation, shear lag, and longitudinal inertia is shown in the form of curves for cylinders of rectangular cross section and uniform thickness. The contribution of each of the secondary effects to the total reduction in the actual frequency is also indicated.

NACA TN 2686

EXPERIMENTAL INVESTIGATION OF HEAT TRANSFER THROUGH LAMINAR AND TURBULENT BOUNDARY LAYERS ON A COOLED FLAT PLATE AT A MACH NUMBER OF 2.4. Ellis G. Slack. April 1952. 31p. diagrs. (NACA TN 2686)

Wind-tunnel tests of the heat-transfer characteristics for laminar and turbulent boundary layers on a cooled flat plate were conducted at a Mach number of 2.4.

Data were obtained for a Reynolds number range of 1.5×10^5 to 3×10^6 and for a surface-temperature range of -40° F to 45° F with recovery temperature of the order of 65° F. The temperature-recovery factors agreed well with previous flat-plate results. The heat-transfer results were obtained with negative temperature gradients along the surface and, when related to the constant-surface-temperature case, were, in general, in good agreement with theory.

NACA TN 2687

APPLICATION OF TRANSONIC SIMILARITY. Adolf Busemann. April 1952. 22p. diagrs. (NACA TN 2687)

From a review of the different similarity approaches to compressible potential flow, the meaning and limitations of transonic similarity are traced back to their origin. Although the main text deals with the quasi two-dimensional flow, special suggestions for the case of axisymmetrical bodies are added in an appendix.

NACA RM L52B04

GUST-TUNNEL INVESTIGATION OF DELTA-WING MODEL WITH THE LEADING EDGE SWEPT BACK 60°. Harold B. Pierce and Slaton L. Johns. April 1952. 12p. diagrs., photo., 3 tabs. (NACA RM L52B04)

A gust-tunnel investigation of a delta-wing model with the leading edge swept back 60° has indicated that the gust load is greater than would be predicted by using a slope of the lift curve determined from steady-flow force tests. The use of a slope of a lift curve derived from simple aspect-ratio considerations resulted in a good estimate of the load.

NACA TM 1318
National Advisory Committee for Aeronautics.
FRICTION AND WEAR. (Le frottement et l'usure). J. Pomey. March 1952. 108p. diagrs., photos., 12 tabs. (NACA TM 1318. Trans. from Office National d'Études et de Recherches Aéronautiques, Rapport Technique 36, 1948; Groupement Francais pour le Développement des Recherches Aéronautiques).

This report covers a general survey of the field of friction and wear. This survey includes discussions of hydrodynamic lubrication, boundary lubrication, seizure and dry friction. Definitions are derived, fundamentals are discussed in considerable detail, and the effects of surface films (adsorbed lubricants or chemically reacted compounds) are studied. Some experimental results are also included.

NACA TM 1336

DEVELOPMENT OF A LAMINAR BOUNDARY LAYER LAYER BEHIND A SUCTION POINT. (Entwicklung einer laminaren grenzschicht hinter einer absaugestelle). W. Wuest. March 1952. 18p. diagrs. (NACA TM 1336. Trans. from Ingenieur-Archiv, v. 17, 1949, p.199-206).

A theoretical investigation is made of the development of a laminar boundary layer behind a suction slot that is assumed to cut off part of the boundary layer without exerting any sink effect. The development, which is approximate, is based on the heat conduction equation. The heat conduction equation enters the analysis through a linearization of the Prandtl-Mises form of the boundary-layer equation.

BRITISH REPORTS

N-13865*

National Gas Turbine Establishment (Gt. Brit.)
AIR COOLING METHODS FOR GAS TURBINE COMBUSTION SYSTEMS. F. J. Bayley. August 1951. 44p. diagrs. (NGTE R.101)

Presents an account of the whole of the work which has been done at N.G.T.E. on the problem of cooling gas turbine combustion systems. Each of the different methods of wall cooling is discussed separately and the theory and mechanism of the cooling process is developed from first principles. Sufficient information is given to enable any of the various methods to be applied to practical wall cooling problems. A comparison is made between the effectiveness of the cooling systems and their relative advantages and disadvantages for different gas turbine applications are discussed.

N-13906*

Royal Aircraft Establishment (Gt. Brit.)
A CONTRIBUTION TO NON-LINEAR MECHANICS GRAPHICAL INTEGRATION OF EQUATIONS OF THE TYPE $\ddot{X} + F(X)\dot{X} + X = 0$. F. Holoubek. November 1951. 19p. diagrs., photos. (RAE Tech. Note Mech. Eng. 99)

The equation $\ddot{x} + f(x)\dot{x} + x = 0$ is characteristic of the motion of an oscillatory system in which the damping is a function of the displacement. In systems largely departing from linearity the quasi-harmonic solution becomes rather inaccurate. This paper describes a graphical method of double integration of the equation, made relatively simple by the use of two elementary computing aids. A method of "linearization" of the general equation in certain cases is also discussed.

N-14086*

National Gas Turbine Establishment (Gt. Brit.)
THE N.G.T.E. MODEL-DISC SPINNING-RIG, AND THE EFFECT OF BORE AND BOLT-HOLES ON BURSTING SPEEDS. A. Graham and V. C. H. Bailey. May 1951. 29p. diagrs., photos., 3 tabs. (NGTE R. 91)

A description is given of a spinning rig driven by an air turbine capable of bursting disks of up to about 8 inches diameter and 4 pounds in weight. Bursting experiments on disks in an as-cast aluminum alloy, chosen for its uniformity and isotropy, gave a consistent value for the reduction of bursting speed due to an uncompensated hole, and this agreed with the mean of a range of values found by other workers who used a variety of materials. Various peculiarities are found to be explicable in general terms, and the conclusion is drawn that experimental variations in the weakening due to a hole, and the amount by which bursting speed differs from that to be expected from a calculated elastic distribution of stress, may be due to specified differences in the stress/strain properties of the materials which are not revealed by conventional measures of ductility.

UNPUBLISHED PAPERS

N-12154*

Pennsylvania State Coll. Engineering Experiment Station. BENDING OF THIN PLATES WITH SMALL COMPOUND CURVATURE. H. G. Lew and J. A. Fox. August 28, 1951. 58p. diagrs., photo., 8 tabs. (Pennsylvania State Coll. Engineering Experiment Station)

An analysis is presented of the behavior of thin plates with a small amount of initial curvature under edge loads. Small deflection problems of the plate were considered. For these problems, a number of closed form solutions are presented; and, in addition the Rayleigh-Ritz method was used where closed form solutions are not possible. Some tests were made. The results for small initial curvature compared favorably with theoretical results. Methods are presented in the form that they can be applied readily to the solution of thin plates under edge loads or surface loads.

DECLASSIFIED NACA REPORTS

NACA RM A9E31

TESTS OF THE NACA 64-010 AND 64A010 AIRFOIL SECTIONS AT HIGH SUBSONIC MACH NUMBERS. Albert D. Hemenover. July 8, 1949. 19p. diagrs., tab. (NACA RM A9E31) (Declassified from Restricted, 3/10/52)

Aerodynamic characteristics of the NACA 64-010 and 64A010 airfoil sections are compared from wind-tunnel tests at Mach numbers from 0.3 to 0.9.

NACA RM E8J13

INVESTIGATION OF A VARIABLE MACH NUMBER SUPERSONIC TUNNEL WITH NONINTERSECTING CHARACTERISTICS. John C. Evvard and DeMarquis D. Wyatt. November 15, 1948. 28p. diagrs., photos., tab. (NACA RM E8J13) (Declassified from Confidential, 3/10/52)

A method is presented for the design of supersonic wind-tunnel nozzles that produce uniform flow over a continuously variable Mach number range without the use of flexible walls. Experimental results obtained from a preliminary investigation of such a tunnel are included. Mach numbers were obtained in the range of 1.75 to 2.65 with less than 1-percent variation in Mach number in the test section downstream of an over-expansion region observed in the neighborhood of the nozzle throat.

NACA RM E8L10

PERFORMANCE OF SUPERSONIC AXIAL-FLOW COMPRESSORS BASED ON ONE-DIMENSIONAL ANALYSIS. Linwood C. Wright and John F. Klapproth. March 25, 1949. 29p. diagrs. (NACA RM E8L10) (Declassified from Confidential, 3/28/52)

A general analysis of the computed pressure ratio and mass flow of four practical types of single-stage axial-flow supersonic compressor is given. The ultimate performance of supersonic compressors is not discussed. Instead the factors limiting present design are considered in order to outline the performance that seems obtainable in the best design based on present knowledge of the four configurations.

NACA RM E9I21

TEMPERATURE SURVEY OF THE WAKE OF TWO CLOSELY LOCATED PARALLEL JETS. John L. Sloop and Gerald Morrell. February 6, 1950. 37p. diagrs., photos., 8 tabs. (NACA RM E9I21) (Declassified from Confidential, 3/10/52)

A temperature survey was made of the wake of two closely located parallel jets emerging into the atmosphere from two types of twin convergent nozzle: (1) 1-inch-diameter throats with centers 1.42 inches apart, and (2) 0.863-inch-diameter throats with centers 1.5 inches apart followed by simulated 1-inch-diameter shrouds 0.466 inch long. Expansion ratio was 9.7; average jet total temperature, 1334° F; and ratio of specific heats, about 1.27. In the case of jets issuing from shrouded nozzles, less interaction occurred than for jets issuing from unshrouded nozzles.

NACA RM E9L01

TEMPERATURE AND PRESSURE DISTRIBUTIONS IN DUAL PARALLEL JETS IMPINGING ON THE GROUND FROM A TURBOJET ENGINE. J. Elmo Farmer, Francis S. Stepka and Floyd B. Garrett. February 20, 1950. 23p. diagrs., photo. (NACA RM E9L01) (Declassified from Confidential, 3/10/52)

An investigation was conducted to determine the temperature and pressure distributions in dual jets of a

turbojet engine located close together and impinging on the ground at an angle of 20°. The temperature and pressure profiles obtained in the investigation indicate that a pronounced mutual interference between the two parallel jets beyond 1 diameter downstream of the nozzle exits caused the gases to expand upward between the two jets. The jet boundary was found to be farther above the ground between the two jets than it was directly behind them.

NACA RM L7L29

THE NACA 2000-HORSEPOWER PROPELLER DYNAMOMETER AND TESTS AT HIGH SPEED OF AN NACA 10-(3)(08)-03 TWO-BLADE PROPELLER. Blake W. Corson, Jr. and Julian D. Maynard. July 20, 1948. 85p. diagrs., photos., 3 tabs. (NACA RM L7L29) (Declassified from Restricted, 3/28/52)

Contains detailed description of a 2000-horsepower propeller dynamometer used to make wind-tunnel tests of a two-blade NACA 10-(3)(08)-03 propeller for a range of blade angles from 20° to 55° at airspeeds up to 500 miles per hour. The results of these tests and comparisons with results obtained from a theoretical analysis and from previous tests made in other wind tunnels are presented.

NACA RM L8E26

AERODYNAMIC CHARACTERISTICS AT HIGH SPEEDS OF A TWO-BLADE NACA 10-(3)(062)-045 PROPELLER AND OF A TWO-BLADE NACA 10-(3)(08)-045 PROPELLER. William Solomon. October 1, 1948. 54p. diagrs., photo., tab. (NACA RM L8E26) (Declassified from Confidential, 3/28/52)

Characteristics are given for the two-blade NACA 10-(3)(062)-045 propeller and for the two-blade NACA 10-(3)(08)-045 propeller over a range of advance ratio from 0.5 to 3.8, the blade-angle range covering 20° to 55° measured at the 0.75 radius. Maximum efficiencies of the order of 91.5 to 92 percent were obtained for the propellers. The propeller with the thinner airfoil sections over the outboard portion of the blades, the NACA 10-(3)(062)-045 propeller, had lower losses at high tip speeds, the difference amounting to about 5 percent at a helical tip Mach number of 1.10.

NACA RM L8G19

WIND-TUNNEL INVESTIGATION AT LOW SPEEDS OF THE PITCHING DERIVATIVES OF UNTAPERED SWEPT WINGS. Robert MacLachlan and Lewis R. Fisher. September 29, 1948. 22p. diagrs., photo., tab. (NACA RM L8G19) (Declassified from Restricted, 3/10/52)

Contains wind-tunnel results of the independent effects of varying aspect ratio and angle of sweep on the longitudinal rotary stability derivatives of a series of untapered wings tested in pitching flow. Comparison is made of experimental and theoretical results.

NACA RM L8H10

EFFECT OF AIRFOIL PROFILE OF SYMMETRICAL SECTIONS ON THE LOW-SPEED STATIC-STABILITY AND YAWING DERIVATIVES OF 45° SWEPTBACK WING MODELS OF ASPECT RATIO 2.61. William Letko and Byron M. Jaquet. November 9, 1948. 21p. diagrs., photo., tab. (NACA RM L8H10) (Declassified from Restricted, 3/10/52)

Contains results of tests made in the Langley stability tunnel for determining the effects of airfoil profile of symmetrical sections on the low-speed static-stability and yawing derivatives of untapered 45° sweptback wing models of aspect ratio 2.61. The wings had the following profiles normal to the leading edge: biconvex (12 percent thick), NACA 65_1-012, and NACA 0012.

NACA RM L8J07

THE EFFECT OF NEGATIVE DIHEDRAL, TIP DROOP, AND WING-TIP SHAPE ON THE LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A COMPLETE MODEL HAVING A 45° SWEPTBACK WING. M. Leroy Spearman and Robert E. Becht. December 6, 1948. 50p. diagrs., photo., tab. (NACA RM L8J07) (Declassified from Restricted, 3/10/52)

An investigation has been conducted in the Langley 300-mph 7- by 10-foot tunnel to determine the effect of negative dihedral, tip droop, and wing-tip shape on the low-speed aerodynamic characteristics of a complete model having a 45° sweptback wing. Longitudinal and lateral stability characteristics were obtained for the model with and without tail surfaces.

NACA RM L8L31a

EFFECT OF AIRFOIL PROFILE OF SYMMETRICAL SECTIONS ON THE LOW-SPEED ROLLING DERIVATIVES OF 45° SWEPTBACK-WING MODELS OF ASPECT RATIO 2.61. William Letko and Jack D. Brewer. March 4, 1949. 27p. diagrs., photo., 2 tabs. (NACA RM L8L31a) (Declassified from Restricted, 3/10/52)

Contains results of tests made in the Langley stability tunnel to determine the effects of airfoil profile of symmetrical sections on the low-speed rolling derivatives of untapered 45° sweptback-wing models of 2.61 aspect ratio. The wings had the following profiles normal to the leading edge: biconvex (12 percent thick), NACA 65_1-012, and NACA 0012. Also contains calculations of stability boundaries and motions at subsonic speeds of a transonic airplane configuration using the different wing profiles.

NACA RM L9D29

THE EFFECT OF BLADE-SECTION THICKNESS RATIOS ON THE AERODYNAMIC CHARACTERISTICS OF RELATED FULL-SCALE PROPELLERS AT MACH NUMBERS UP TO 0.65. Julian D. Maynard and Seymour Steinberg. June 6, 1949. 90p. diagrs., photos., tab. (NACA RM L9D29) (Declassified from Confidential, 3/28/52)

Results of an investigation of two full-scale NACA propellers are presented for a range of blade angles from 20° to 55° at airspeeds up to 500 miles per hour. These results are compared with the results from previous tests of five related NACA propellers to evaluate the effects of blade-section thickness ratios on propeller aerodynamic characteristics.

NACA RM L50I13
National Advisory Committee for Aeronautics.
INVESTIGATION OF THE PRESSURE-RATIO REQUIREMENTS OF THE LANGLEY 11-INCH HYPERSONIC TUNNEL WITH A VARIABLE GEOMETRY DIFFUSER. Mitchel H. Bertram. October 6, 1950. 19p. diagrs. (NACA RM L50I13) (Declassified from Confidential, 3/10/52)

Tests were conducted in the Langley 11-inch hypersonic tunnel at a Mach number of 6.86 to determine the stagnation pressure ratios across the system required to maintain supersonic flow with the use of a variable-geometry diffuser. With such a diffuser, it was possible in some cases to reduce the pressure ratio required to maintain flow to about one-third of that required for starting with a consequent quadrupling of the duration of test run.

NACA-Langley - 4-25-52 - 4000

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